

299-W19-1 (A4944) Log Data Report

Borehole Information:

Borehole: 299-W19-1 (A4944)		Site: 216-U-3 Crib			
Coordinates (WA State Plane)		GWL (ft)¹: Dry		GWL Date: 08/21/2003	
North	East	Drill Date	TOC² Elevation	Total Depth (ft)	Type
134,925.62 m	566,886.93 m	May 1957	206.392 m	301	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	1.55	8 5/8	8	5/16	+1.55	301
The logging engineer measured the casing stickup using a steel tape. A caliper was used to determine the outside casing diameter. The caliper and inside casing diameter were measured using a steel tape, and measurements were rounded to the nearest 1/16 in. Casing thickness is reported as a fraction. Casing bottom is as reported from the well completion summary report (Ledgerwood 1993).						

Borehole Notes:

Borehole coordinates, elevation, and well construction information, as shown in the above tables, are from measurements by Stoller field personnel, Ledgerwood (1993), and HWIS³. Zero reference is the top of the 8-in. casing. An abandoned borehole is located 1 ft north of this location. A casing is present at the ground surface filled with grout and labeled with a brass marker identifying it as W19-01. Fill is reported at the bottom of the borehole at approximately 206 ft (Ledgerwood 1993).

Logging Equipment Information:

Logging System:	Gamma 1E	Type:	SGLS (70%) 34TP40587A
Calibration Date:	07/2003	Calibration Reference:	GJO-2003-468-TAR
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 / Repeat	3		
Date	08/21/03	08/22/03	08/22/03		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	212.0	137.0	114.0		
Finish Depth (ft)	115.0	115.0	2.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N/A ⁴	N/A	N/A		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A	N/A	N/A		

Log Run	1	2 / Repeat	3		
Pre-Verification	AE023CAB	AE025CAB	AE025CAB		
Start File	AE024000	AE025000	AE025023		
Finish File	AE024097	AE025022	AE025135		
Post-Verification	AE024CAA	AE025CAA	AE025CAA		
Depth Return Error (in.)	-1	N/A	-1		
Comments	No fine-gain adjustment.	Repeat section	No fine-gain adjustment.		

Logging Operation Notes:

Zero reference was top of the 8-in. casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K , ^{238}U , and ^{232}Th) verifier with serial number 118. Logging began approximately 0.75 ft off the bottom of the borehole.

Analysis Notes:

Analyst:	Sobczyk	Date:	10/02/03	Reference:	GJO-HGLP 1.6.3, Rev.0
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SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. All of the verification spectra were within the control limits except for spectra AE023CAB and AE025CAA. Both AE023CAB and AE025CAA were slightly above the upper lower control limit for the 1461-keV peak counts per second (cps) value. The peak counts per second at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were between 3 percent lower and 2 percent higher at the end of the day. Examinations of spectra indicate that the detector appears to have functioned normally during logging, and the spectra are accepted.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Pre-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G1EJul03.xls). Zero reference was the top of the 8-in. casing. On the basis of Ledgerwood (1993) and field measurements, the casing configuration was assumed as one string of 8-in. casing with a thickness of 5/16 in. to 212 ft (total logging depth). Dead time and water corrections were not required.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K , ^{238}U , and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The ^{214}Bi peak at 609 keV was used to determine the naturally occurring ^{238}U concentrations on the combination plot rather than the ^{214}Bi peak at 1764 keV because it exhibited slightly higher net counts per second.

Results and Interpretations:

^{137}Cs was the only man-made radionuclide detected in this borehole. ^{137}Cs was detected in the interval from the ground surface (2 ft) to a depth of 22 ft. ^{137}Cs was also detected intermittently in the interval from

179 to 193 ft. The range of concentrations was from the MDL (0.2 pCi/g) to 1.3 pCi/g, which was measured at the ground surface. ¹³⁷Cs was detected at 36 ft, 51 ft, 65 ft, 73 ft, 81 ft, and 90 ft with a concentration near the MDL.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural radionuclides at energy levels of 609, 1461, 1764, and 2614 keV.

Recognizable changes in the KUT logs occurred in this borehole. ⁴⁰K and ²³²Th concentrations increase by approximately 5 pCi/g and 0.3 pCi/g, respectively, at 53 ft. A decrease of approximately 5 pCi/g in ⁴⁰K and 0.5 pCi/g in ²³²Th concentrations occurs at 149 ft. ²³²Th concentrations increase by 0.5 pCi/g in the interval between 130 and 148 ft. The increase in ⁴⁰K activities at about 53 ft represents the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2. The 0.5-pCi/g increase in ²³²Th at 130 ft corresponds with the Hanford early Palouse Soil Interface.

References:

Ledgerwood, R.K., 1993. *Summaries of Well Construction Data and Field Observations for Existing 200-West Resource Protection Wells*, WHC-SD-ER-TI-005, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

¹ GWL – groundwater level

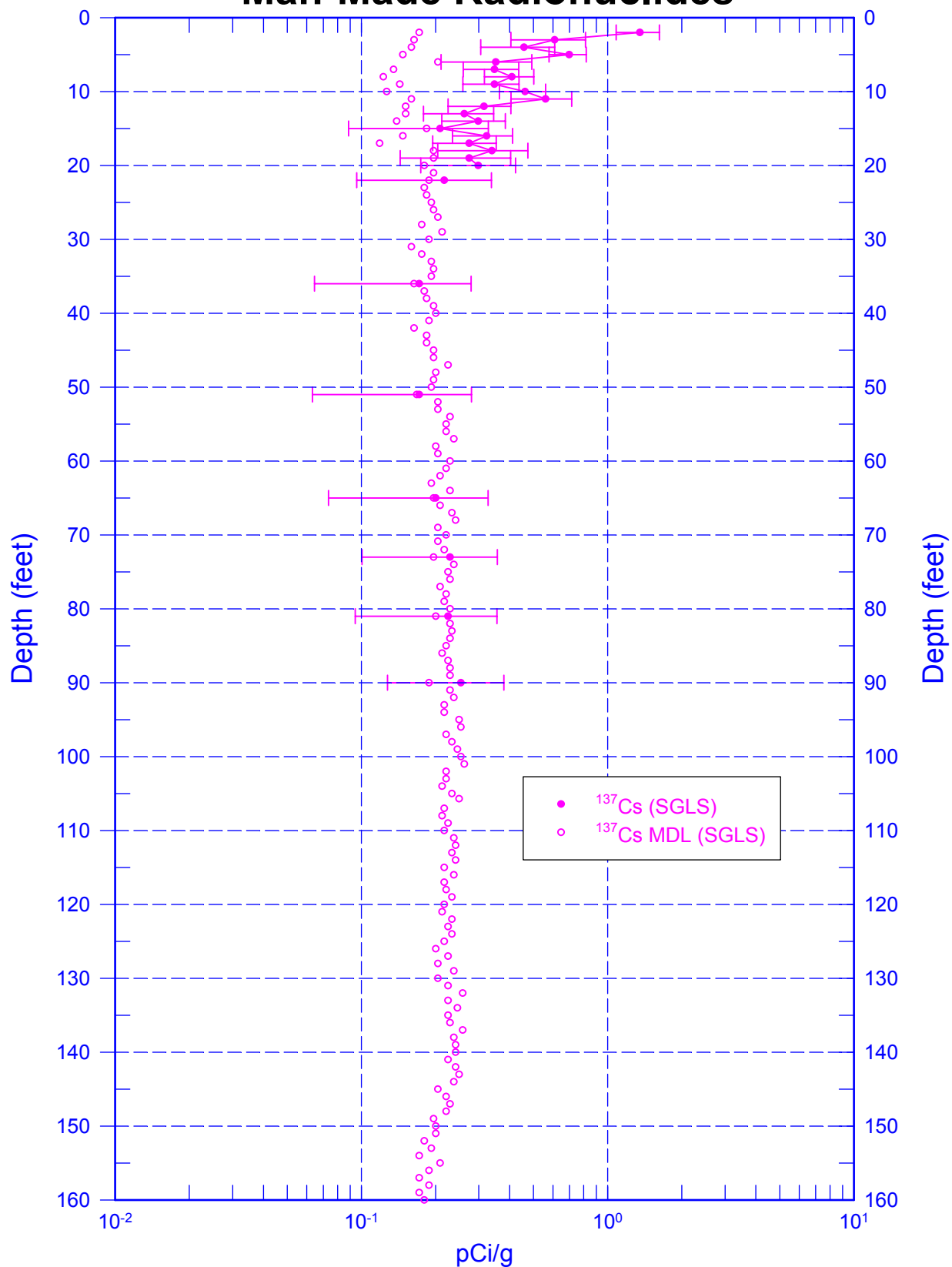
² TOC – top of casing

³ HWIS – Hanford Well Information System

⁴ N/A – not applicable

299-W19-01 (A4944)

Man-Made Radionuclides

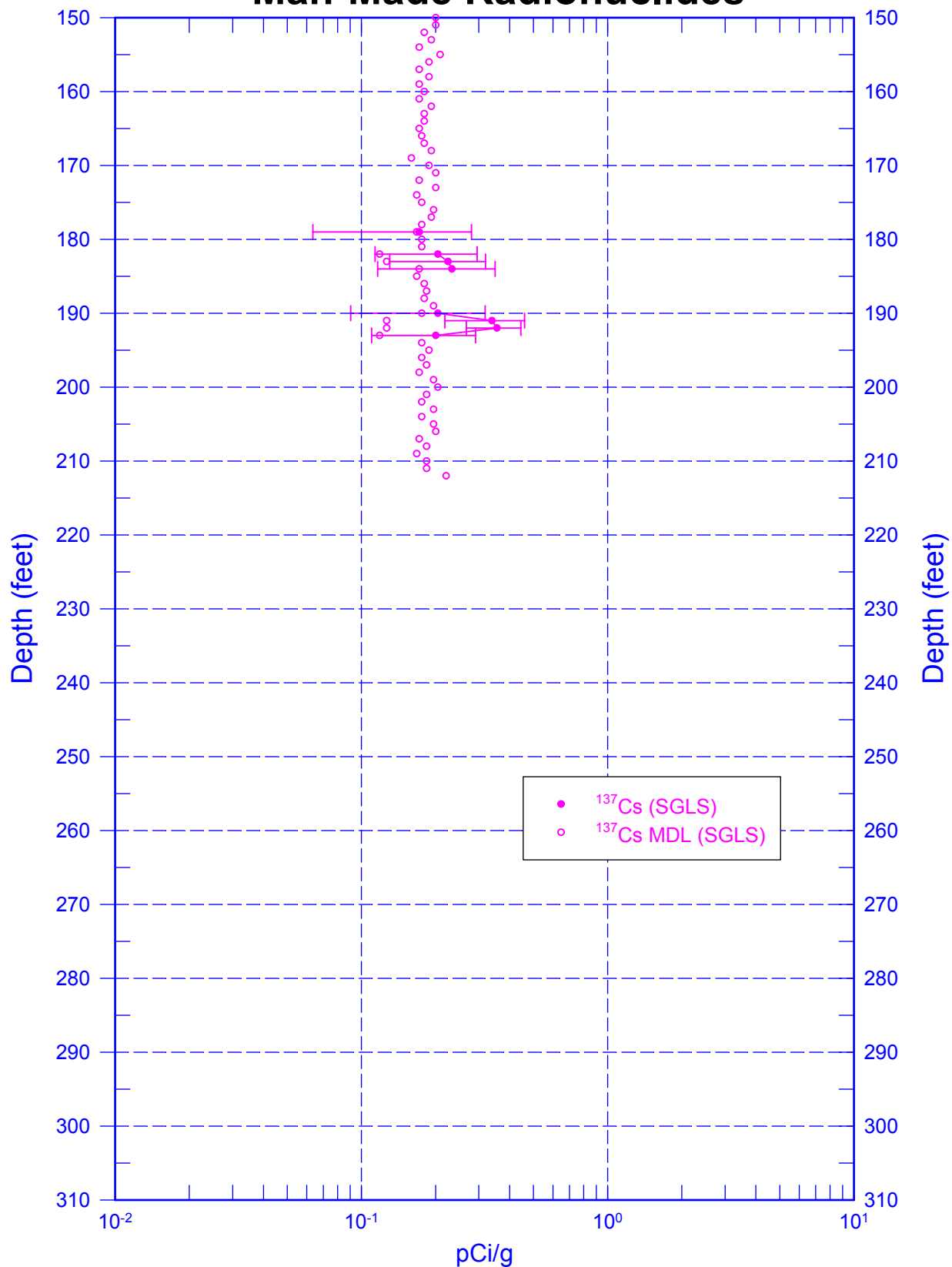


Zero Reference = Top of Casing

Date of Last Logging Run
8/22/2003

299-W19-01 (A4944)

Man-Made Radionuclides

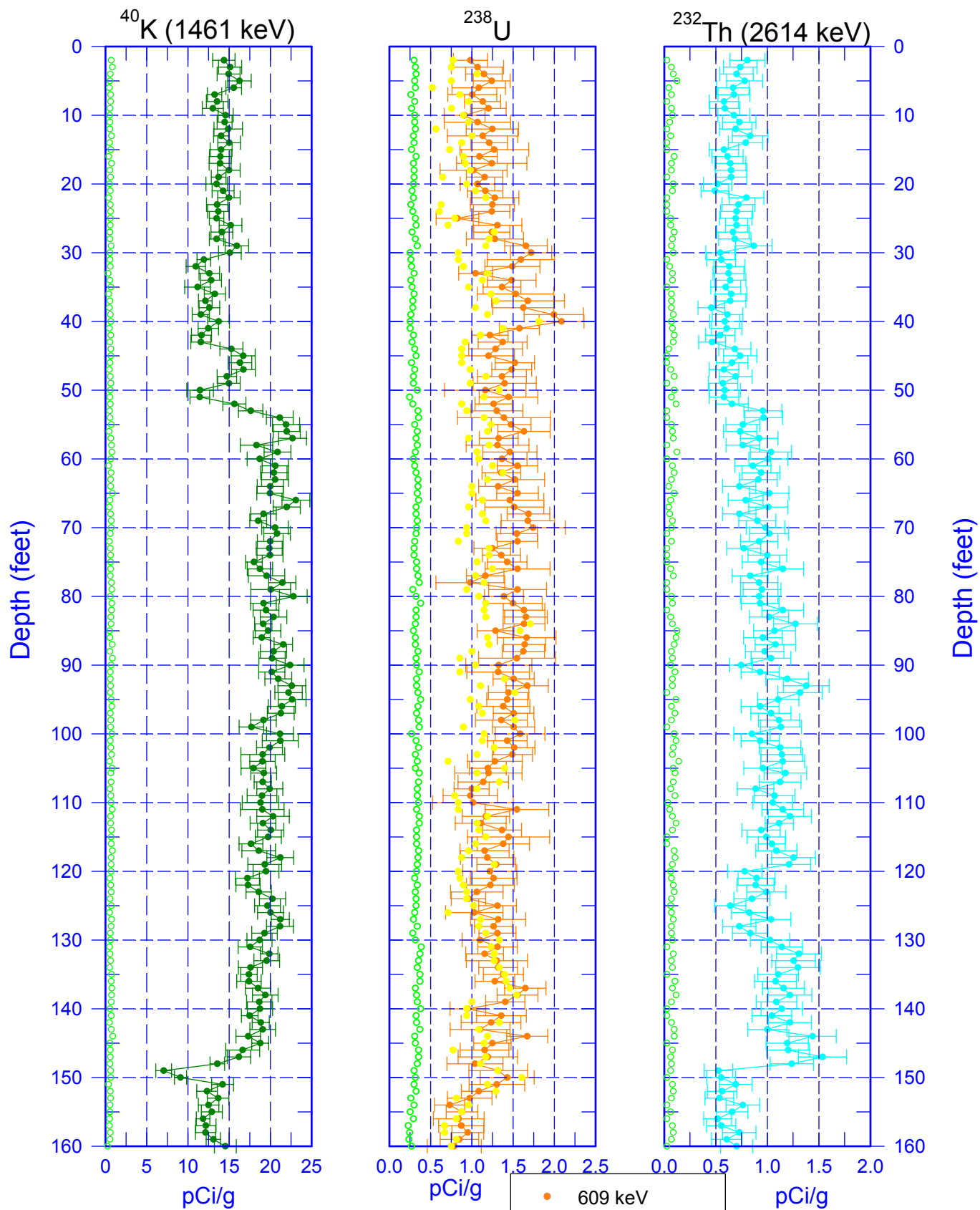


Zero Reference = Top of Casing

Date of Last Logging Run
8/22/2003

299-W19-01 (A4944)

Natural Gamma Logs

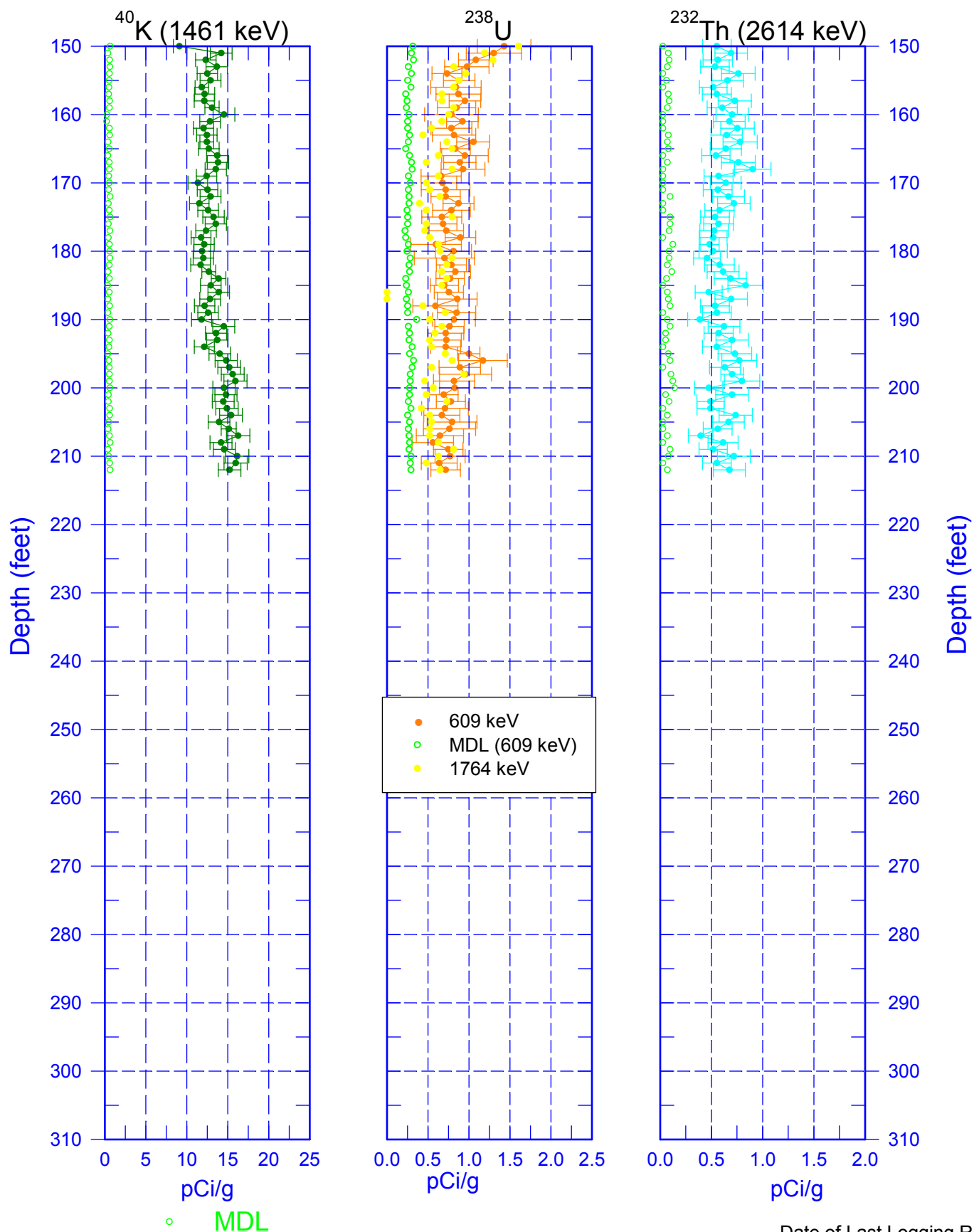


Zero Reference = Top of Casing

Date of Last Logging Run
8/22/2003

299-W19-01 (A4944)

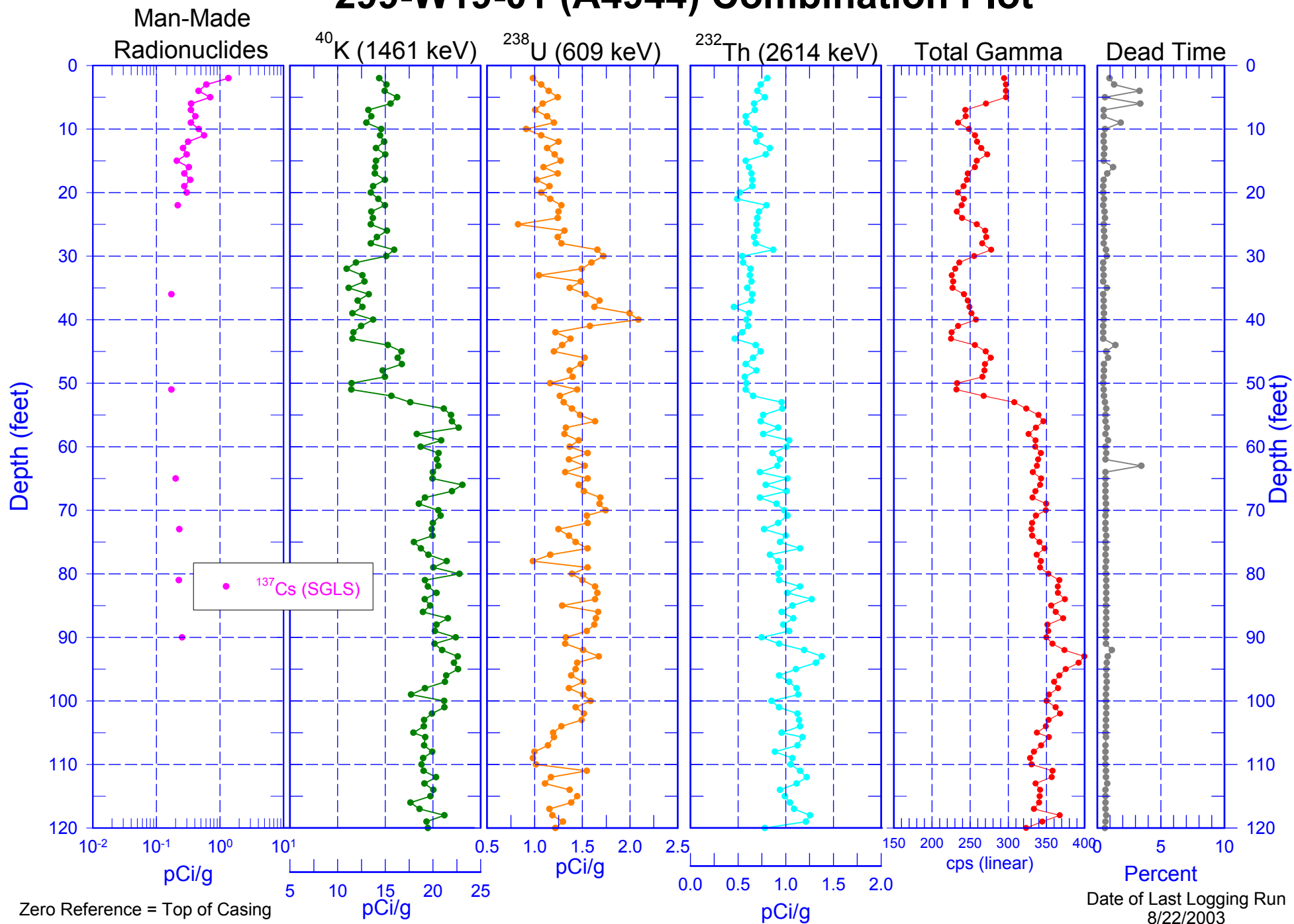
Natural Gamma Logs



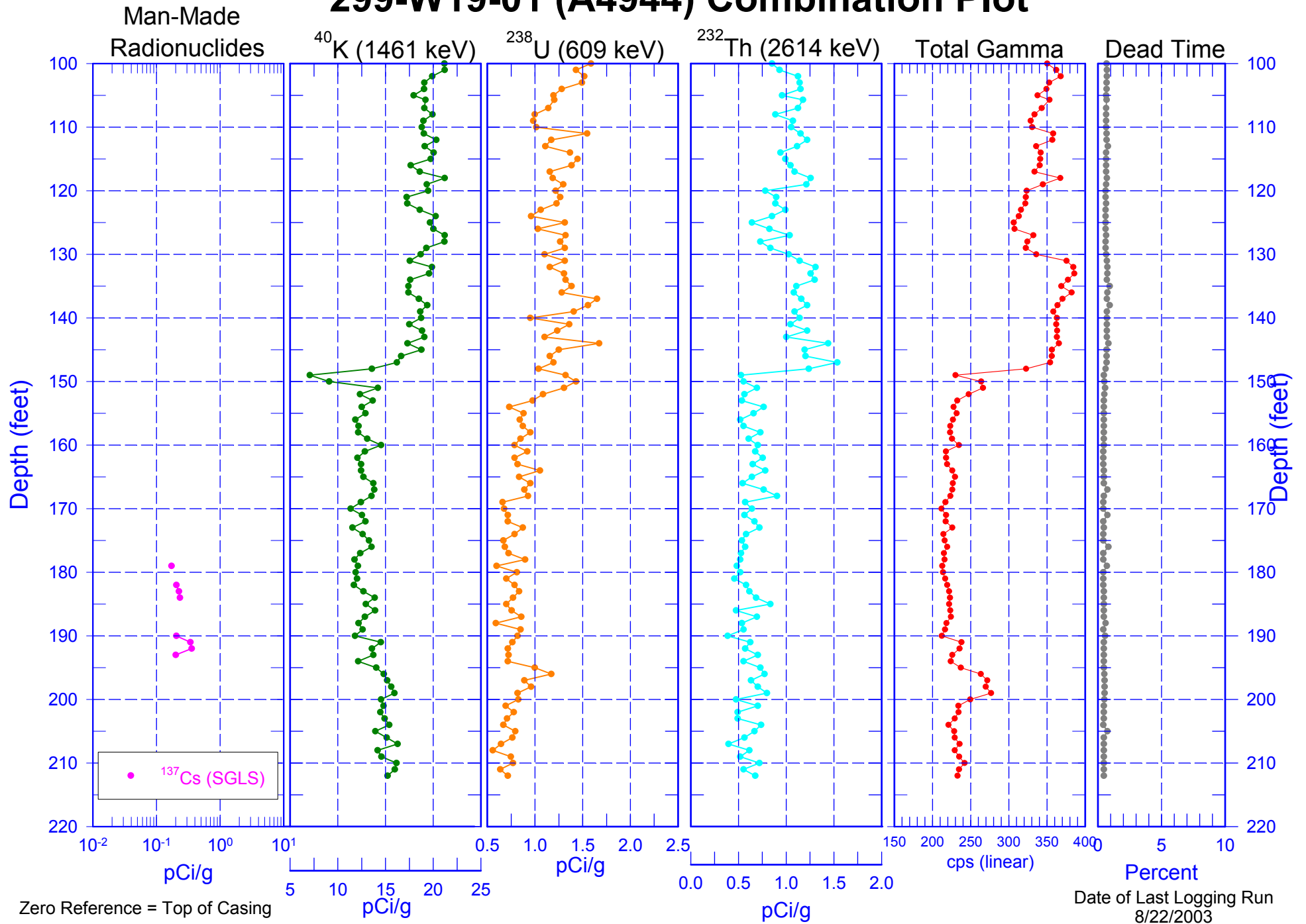
Zero Reference = Top of Casing

Date of Last Logging Run
8/22/2003

299-W19-01 (A4944) Combination Plot

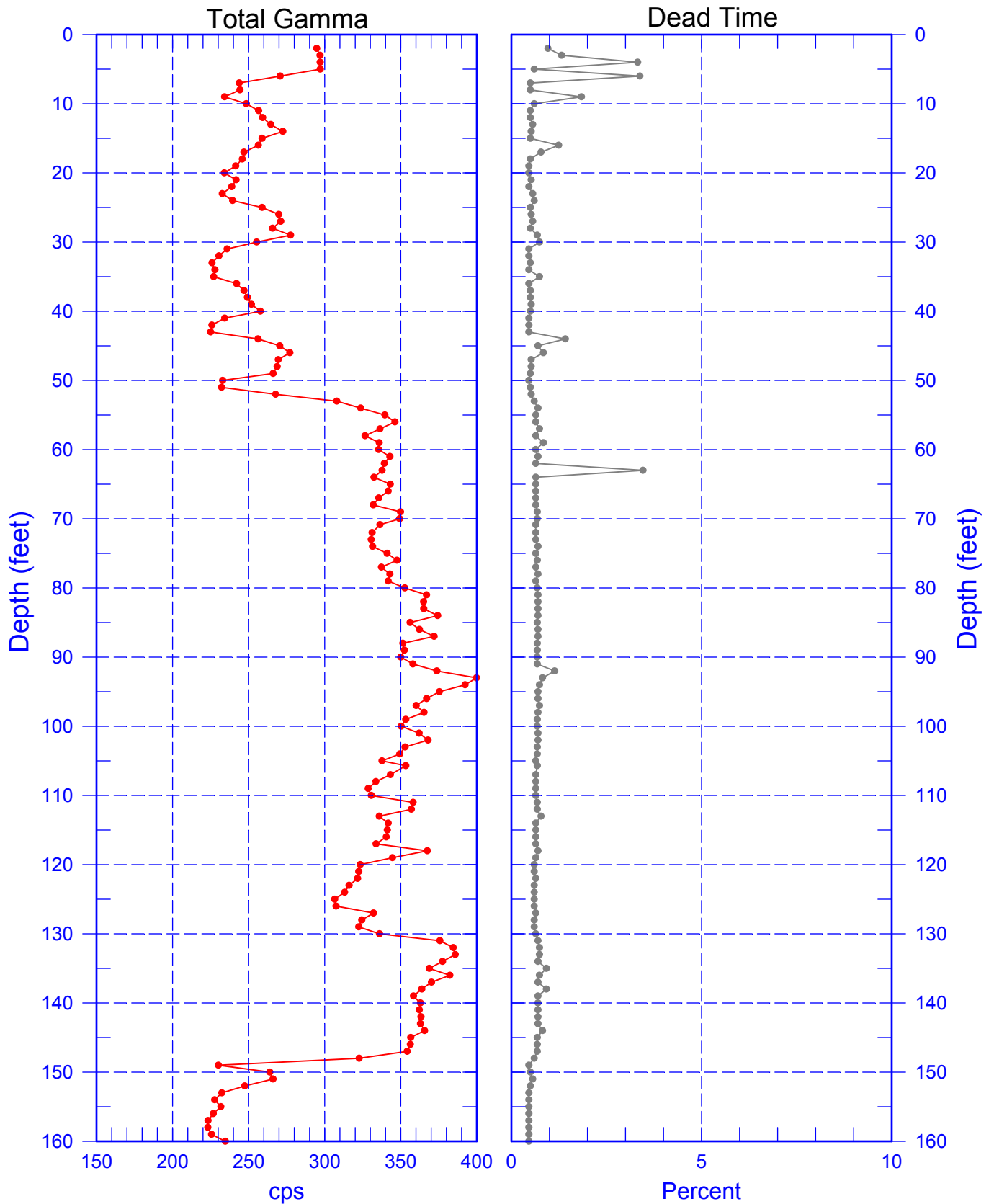


299-W19-01 (A4944) Combination Plot



299-W19-01 (A4944)

Total Gamma & Dead Time

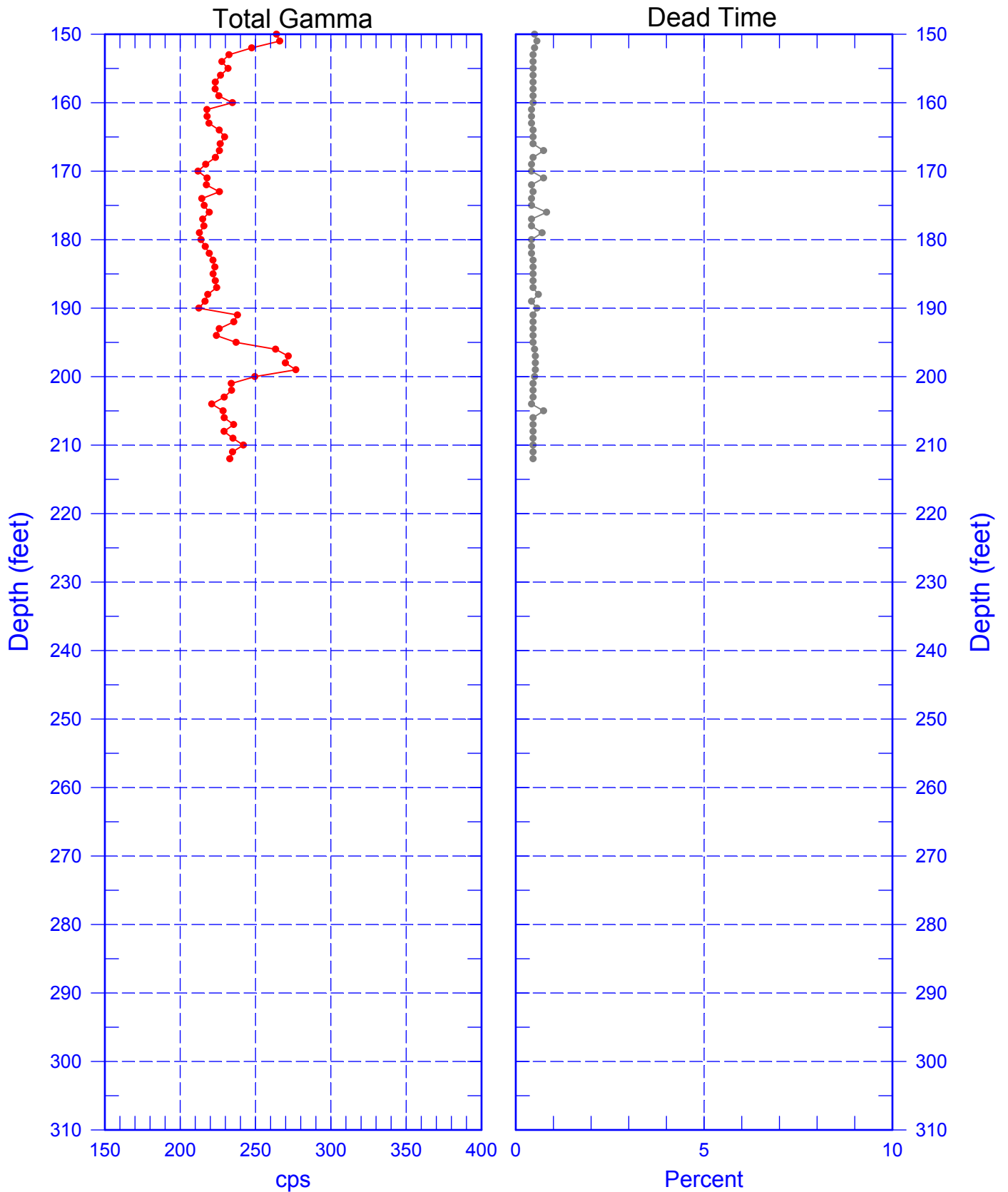


Zero Reference = Top of Casing

Date of Last Logging Run
8/22/2003

299-W19-01 (A4944)

Total Gamma & Dead Time



Zero Reference = Top of Casing

Date of Last Logging Run
8/22/2003

299-W19-01 (A4944)

Rerun of Natural Gamma Logs (137.0 to 115.0 ft)

